

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**



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Order Instituting Rulemaking to Implement the)	
Commission's Procurement Incentive Framework)	
and to Examine the Integration of Greenhouse Gas)	Rulemaking 06-04-009
Emissions Standards into Procurement Policies)	(Filed April 13, 2006)

**COMMENTS OF MORGAN STANLEY CAPITAL GROUP INC.
ON THE MARKET ADVISORY COMMITTEE TO THE CALIFORNIA
AIR RESOURCES BOARD'S RECOMMENDATIONS FOR DESIGNING
A GREENHOUSE GAS CAP-AND-TRADE SYSTEM FOR CALIFORNIA**

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**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to Implement the Commission's Procurement Incentive Framework and to Examine the Integration of Greenhouse Gas Emissions Standards into Procurement Policies))))	Rulemaking 06-04-009 (Filed April 13, 2006)
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I. INTRODUCTION

Pursuant to the July 19, 2007 ruling of Administrative Law Judges Charlotte F. TerKeust and Jonathan Lakritz, Morgan Stanley Capital Group Inc. ("MSCG") respectfully submits its comments on the Market Advisory Committee to the California Air Resources Board's Recommendations for Designing a Greenhouse Gas Cap-And-Trade System for California ("MAC Report").¹

II. COMMENTS

MSCG submits these comments on the MAC Report's cap-and-trade framework with the following principles in mind: (a) the system should not interfere with the efficient operation of the energy industry, especially the ability of market participants to contract in a manner that most economically meets supply and reliability needs; (b) the price of greenhouse gas ("GHG") emissions must be available to the market and reflected in dispatch decisions in order to achieve

¹ Administrative Law Judges' Ruling Requesting Comments and Legal Briefs on Market Advisory Committee Report and Notice of En Banc Hearing, *Order Instituting Rulemaking to Implement the Commission's Procurement Incentive Framework and to Examine the Integration of Greenhouse Gas Emissions Standards into Procurement Policies* (Docket No. R.06-04-009) (issued July 19, 2007) (hereinafter "ALJs' Ruling").

a real change in emissions; and (c) the emissions attribute must be separable from the energy component (and capacity, if imposed),² and allowed to be traded independently. Following these principles will allow California to fulfill its emissions reductions goals and to do so at minimum cost.

MSCG has stated repeatedly in its comments to the Commission and the California Air Resources Board (“CARB”) that a source-based emissions design is superior to a load-based model. Ideally, there would be a uniform source-based system across at least the entire Western Electricity Coordinating Council (“WECC”) and across all emissions sources. Although not solely a sourced-based approach, the MAC Report’s recommended “first-seller” standard makes the best of a difficult situation in light of the Legislature’s mandate that the State account for GHG emissions attributable to imports in a meaningful manner.³

Given that California alone cannot address the challenges of stabilizing the global climate by reducing its GHG emissions to zero, it is clear that California is taking the lead with the hope that other states will follow its example. Therefore, MSCG suggests that one of the primary purposes of the program should be to create a model that other jurisdictions can look to as a “best practice.” With this goal in mind, California should not be overly focused on trying to stop market activities such as contract shuffling which logically will lead to GHG emissions leakage. It is likely that these activities cannot be eliminated, as they will be an inevitable consequence of California acting unilaterally regardless of the program’s design. Instead, the State should focus

² MSCG does not acknowledge that the concept of “capacity,” as discussed in a “Resource Adequacy” context, is valid. *See, e.g.,* Pre-Workshop Comments on Track 2 Proposals of Morgan Stanley Capital Group Inc., *Order Instituting Rulemaking to Consider Refinements to and Further Developments of the Commission’s Resource Adequacy Requirements Program* (R.05-12-013) (filed May 18, 2007) (commenting that MSCG does not believe that capacity markets are necessary to spur generation investment).

³ *See* AB 32 § 38530(b)(2) (requiring that the State “[a]ccount for greenhouse gas emissions from all electricity consumed in the state” including electricity “imported from outside the state”).

on designing a program that, if emulated regionally, nationally and internationally, would result in a meaningful reduction in GHG emissions in the most efficient and least costly manner possible.

1. Is the ALJ's Ruling description of the deliverer/first-seller approach accurate? Comment on whether you agree with this description, and if not, explain how the first-seller approach should be described differently and why.

The ALJs' Ruling summarizes accurately the first-seller approach discussed in the MAC Report.⁴ MSCG agrees with the MAC Report that the point of regulation for all in-state generation should be the generator.⁵ However, the responsible entity or point of regulation for "imported power" should be defined as the "importer." The importer, in turn, would be defined as: (a) the party responsible for scheduling the energy across the interface; or (b) the party receiving the energy after title transfer occurs at the interface.

2. For imports, who has ownership of electricity when it enters California? Is the "Purchasing/Selling Entity" (on the North American Electric Reliability Corporation (NERC) E-tag) listed at the first Point of Delivery in California the deliverer/first seller? If this is generally the case, are there any exceptions?

Ownership will vary depending on the terms of the transaction underlying the import. There currently is no general rule for attributing ownership of imported electricity into California without reference to the contract. Nor does it hold true that the first-seller is the Purchasing/Selling Entity listed at the first point of delivery in California in an E-tag. Consequently, it may be difficult to create an "ironclad" verification protocol. However, if California adopts MSCG's suggestion in response to Question 1, the responsible party for any

⁴ ALJs' Ruling at 3. The ALJs' Ruling describes the first-seller concept discussed in the MAC Report as follows: "(a) for in-state California generation, the first seller is the generator, in all cases; and (b) for imported power, the first seller is the entity that first delivers electricity at a point of delivery within California." *Id.* at 3.

given transaction should be unambiguous and regulators will, at a minimum, have a clear path to enforcement.

3. Are there any inter-Balancing Authority imports not accounted for by E-tags? If so, describe these instances and explain how these imports can be accounted for.

Possibly. It is unclear whether cross-border utilities that serve load in California from generation in other states (*e.g.*, Sierra Pacific and PacifiCorp) create E-tags to move power across the state border, since delivery is probably not in a different control area. Moreover, it is unclear what kinds of “tracks” are left by entities that own external generation and transmission assets, and operate their own control areas (*e.g.*, Los Angeles Department of Water and Power and the Western Area Power Administration). Such entities may not have to create E-tags to transport power into California from external resources, thereby reducing the ability of California to rely on E-tags as the sole means for identifying the first seller. However, these issues and uncertainties are not specific to the first-seller or load-based approach, and would exist for any method that tries to track or assign responsibility for imports.

4. What agency could/would identify importing contractual parties? Is there already a state or federal official compilation of these market participants?

It is not clear that any single entity has available to it comprehensive information regarding import activities. Under either a first-seller or a load-based approach, multiple agencies may have to share responsibility for identifying and tracking imports.

⁵ *Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California: Recommendations of the Market Advisory Committee to the California Air Resources Board*, at 43 (June 30, 2007) (“MAC Report”).

5. Could the deliverer/first-seller be identified by means other than the NERC E-tag? If so, please explain.

The California Independent System Operator (CAISO) schedules may provide another means of identifying the first-seller for CAISO-operated interfaces.

6. How would a deliverer/first-seller system deal with power marketers and brokers?

As explained above in the response to Question 1, the description of the first-seller approach should be refined to provide that the “importer” is defined as the party with “custody” on the transmission schedules as the energy crosses the State line. When a power marketer is the importer of record, the power marketer would be responsible for surrendering the appropriate allowances. In cases where a broker submits a schedule on behalf of a third-party, the broker would be the importer and responsible party. It would be up to the broker to negotiate with its client how to source the allowances that would need to be surrendered.⁶

7. How would treatment of imports differ in a deliverer/first-seller system compared to a load-based approach?

The issue of how to assign an emissions rate to an external power source does not appear to be substantively different under either approach. This view is consistent with the MAC Report’s recognition that “the load-based and first-seller approaches seem to have comparable strengths in this area.”⁷

⁶ As a general rule, brokers act as agents for other market participants and do not take title to energy.

⁷ MAC Report at 46.

- 8. To sum up your answers to the previous questions, provide a succinct but complete definition that identifies, for each way in which electricity could be delivered to the California grid, the entities that would be responsible for compliance with AB 32 regulations under a deliverer/first-seller approach.**

Under a first-seller approach, in-state generators and importers would be responsible for submitting emissions allowances for wholesale power delivered in California.

- 9. Compare and contrast the environmental integrity of a deliverer/first-seller and a load-based approach. How would a deliverer/first-seller approach address leakage? How would a deliverer/first-seller approach address contract shuffling?**

As explained above in response to Question 7, neither a first-seller nor a load-based approach will prevent leakage or contract shuffling. Trying to impose a “closed-system” regulatory regime on an open physical supply system creates an insoluble problem. In contrast to a load-based approach, a source-based approach would more clearly tie allowance surrender to physical emissions, at least for in-state resources. This would immediately deliver environmental benefits through the price of emissions being incorporated into dispatching decisions. In addition, the direct responsibility associated with a source-based approach would minimize calculations, estimates, administrative attributions and tracking requirements across ownership chains, as well as avoid other burdensome tasks associated with implementing and managing a load-based approach. A source-based approach also most easily addresses the issue of exports. The more complex the tracking system, the greater the potential for “gaming,” and unintended and unforeseen consequences. Thus, with respect to in-state resources, the approach in the MAC Report provides improved integrity over a load-based construct. In contrast, as explained in response to Questions 7 and 10, neither the MAC Report’s first-seller approach nor a load-based approach will prevent leakage or contract shuffling.

10. Would the scale of possible emissions leakage or contract shuffling differ under the deliverer/first-seller approach compared to a load-based approach?

No. For imports, the issues of leakage and contract shuffling are essentially identical under either a first-seller or load-based approach. Whatever system California ultimately adopts must be designed to ensure that responsibility for emissions is assigned to imports. The only foreseeable substantive difference between the load-based and first-seller approaches is in who will be responsible for surrendering emissions allowances for imports.

11. Is there any advantage to applying the deliverer/first-seller approach to reporting only, while having the retail providers be the point of regulation (as with load-based)? Why or why not?

No. Separating responsibility would complicate, rather than simplify, matters by imposing additional compliance burdens and creating potential regulatory duplication with no discernible purpose.

12. Compare and contrast the deliverer/first-seller and load-based approaches in terms of their impacts on electricity prices, costs, and reliability for consumers.

Although MSCG has not analyzed the issue, some parties who have studied the matter believe that a load-based approach will not result in savings to consumers.⁸ The reliability impact of a load-based or first-seller approach would depend on the implementing rules. However, it is conceivable that reliability could be compromised by a load-based approach if California does not clearly indicate who is responsible for surrendering allowances associated with redispatch and/or problems associated with balancing energy in dispatch. When the point of regulation is the source, both the emissions cost and responsibility are unambiguous.

⁸ There was discussion of such costs at the CAISO Market Surveillance Committee meeting held on June 8, 2007.

13. Would a deliverer/first-seller approach and a load-based approach have different impacts on wholesale power prices? Which would result in higher prices? Why? Is this good or bad?

As stated above in response to Question 12, MSCG has not studied the issue in depth (*i.e.*, in an econometric sense). However, we wish to point out several ways in which a load-based approach has the potential to increase wholesale power prices. First, the complexity of a load-based approach means that its impact on wholesale power prices should be greater than for a first-seller approach. It is axiomatic that increases in administrative complexity result in increases in cost. Second, by interfering with the market's contracting preferences, a load-based approach will have an upward bias on wholesale prices any time a more efficient option is bypassed due to the administrative aspects of the GHG regulatory approach. If a preferred contracting choice is bypassed due solely to the need to comply with GHG regulations, this is a *per se* reduction in efficiency, and therefore an increased cost. Third, by not ensuring that a clear emissions cost signal is included in the information used to set the dispatch, a load-based approach is likely to result in a sub-optimum dispatch solution, which would again bias wholesale prices upwards. Because of these three factors, a load-based approach does not reduce emissions at minimum cost, so the costs passed through to consumers through electricity prices will be greater for the same level of required emissions reductions.

One of the arguments often touted in support of a load-based approach is that it would keep the price of emissions reduction out of the calculation of the marginal clearing price. As discussed elsewhere, keeping the price of emissions out of the dispatch and clearing price is unwise for many reasons other than raw costs. Also, as mentioned previously, others who have studied the matter have reached the conclusion that a load-based approach may not result in reduced prices to consumers. Finally, it should be remembered that the spot market, including the day-ahead spot market, is likely to be only 5-15% of the wholesale market, so the impact of

clearing prices on the gross dollar cost to consumers will be small. Conversely, the upward cost biases described above that will be attributable to the various inefficiencies of a load-based approach are likely to affect most, if not all, of the market.

14. What impact would a deliverer/first-seller approach have on long-term investment in low-GHG emitting generation technologies? Is this better or worse than under a load-based cap? Why?

Since the first-seller approach is source-based for power generated in California, in-state generators would be able to clearly identify a financial benefit from investments that reduce emissions of GHGs on-site. In contrast, for unspecified resource transactions in a load-based system, generators will depend upon periodic regulatory decisions to determine the emissions rate that California will apply to their region. Uncertainty in the “rules of the road” is a well-known disincentive to investment.

15. How would a deliverer/first-seller approach interact with an upstream program design as articulated in Chapter 4 of the Market Advisory Committee report? Explain your answer in detail.

An upstream approach is appropriate for covering emissions sources that are too small to cover as part of a source-based system (*e.g.*, for the transportation sector like cars and trucks representing multiple small emissions sources). Power generation does not fit this definition.

In order to make sure an upstream program design interacts properly with either a first-seller or load-based approach, responsibility for different fuels at the fuel supplier level would need to be carefully documented in order to avoid having the fuel supplier and in-state generators report emissions or surrender duplicate allowances. For example, under an upstream approach, refineries would take responsibility for road transport fuels by measuring their carbon content and surrendering an equivalent quantity of allowances. However, California would have to ensure that any fuel supplied to in-state generators by the same company would be excluded in

order to avoid double counting. In sum, either the upstream program eliminates the need to track emissions from in-state generation or California must devise some method to remove generation fuels from the upstream system.

16. What impact would a deliverer/first-seller approach have on electricity service providers?

No response provided.

17. Compare and contrast the impact that a deliverer/first-seller and a load-based system would have on the existing wholesale energy markets, both at the California Independent System Operator (CAISO) and outside of it.

Compared with a load-based approach, the first-seller approach would minimize interference with the market's preferred contracting and dispatching practices because emissions would not be a factor in contracting decisions, at least for in-state generation. The cost of emissions would be internalized in prices, so the most economically efficient options would be undertaken. Furthermore, there would be no need for California to maintain a separate, elaborate tracking system to try to discern the entity "responsible" for emissions – it will always be the emitter. In addition, under a first-seller construct, the cost of allowances could be included in dispatch decisions.

In contrast, under a load-based approach, the purchaser would need to identify an emissions profile with every purchase decision, and to simplify emissions responsibility tracking, contracting would likely be skewed toward unit-specific contracting to a greater degree than the market would otherwise choose. Parties might inject the issue of who is responsible for supplying the required allowances into the negotiation, thereby adding complexity.

A lack of interference is crucial to overall cost containment, as the markets are most efficient when participants have the flexibility to wait as long as possible to make dispatch decisions. Such efficiency means lower costs and maximum reliability. Thus, dispatch decisions

would be based on prices that are consistent with market fundamentals and transmission constraints, as well as the added optimization parameter of emissions. This, in turn, would maximize the probability that actual changes in dispatch from “dirtier” to “cleaner” units will occur and that the goals of AB 32 are met.

As MSCG and others have pointed out previously to the Commission, a load-based approach is not conducive to factoring emission costs into dispatch decisions, resulting in sub-optimal dispatch. Such a system would rely upon market dynamics introduced by the entity with responsibility – namely the LSE. The entity that dispatches is not responsible for considering emissions in its decision, and also has no information about emissions cost on which to base a dispatch decision. Even if a method is devised to communicate emissions-related information to the dispatcher to factor into basic dispatch decisions, real-time redispatch decisions would have to be made without such information. This would lead to disputes about who is responsible for the associated emissions, and whether an alternate redispatch was available that could have met the same need at a lower emissions cost.

Other, more fundamental, dispatch problems are intrinsic to a load-based approach. For example, when the parties responsible for dispatch decisions are disassociated from the parties responsible for GHG compliance, significant accountability issues are created. Under a load-based approach, the obligation for GHG compliance is placed on the LSE. However, as previously noted, dispatch decisions would remain with CAISO. Thus, although an LSE might contract with a “green resource” to meet its carbon budget, CAISO could essentially trump the LSE’s supply selections through redispatch orders. Under such a scenario, would the LSE be held responsible for surrendering allowances to reflect the green resources in its preferred schedule or would it have to surrender allowances to reflect the units that CAISO actually

dispatched? This hypothetical makes clear that disputes will arise under a load-based approach if load is required to surrender more allowances than budgeted due to CAISO's independent dispatch decisions. The alternative would be that allowance surrender would be based on energy scheduled, not total actual emissions from generated power.

18. For those entities participating in the CAISO markets, what would be the likely differential impacts of a deliverer/first-seller versus a load-based system on the CAISO's implementation of the Market Redesign and Technology Update (MRTU) system, including day-ahead and real-time markets for energy, transmission, and reserves?

MSCG sees no reason why there would be a difference in the impact that either a load-based or first-seller approach would have on MRTU implementation, as both are currently proposed. However, if, for example, it was determined that some methodology must be devised to communicate emissions costs to the CAISO, and for it to then alter its dispatch algorithm to optimize on this additional parameter, then the incremental programming required would likely cause additional implementation delay. The probabilities of such requirements seem much higher with a load-based system.

19. To what extent would either approach (deliverer/first-seller or load-based) be likely to alter the dispatch of existing generation units in the near-term? Why? If there is a difference between the approaches, how significant would it be?

The first-seller approach will change dispatch of existing generation units in the near-term because suppliers will take emissions costs into account when making bidding decisions. A load-based approach also may have some impact on the dispatch of existing generation units because of the ability in some situations for suppliers to bid certain resources in at "zero" to maximize the chance of dispatch. However, for the reasons explained above in response to Question 17, a load-based approach would not address CAISO redispatch decisions and could

actually lead to greater administrative burdens due to disputes about who is responsible for surrendering allowances arising from redispatch.

20. How would a deliverer/first-seller approach interact with the Public Utilities Commission's Resource Adequacy requirements and procurement/portfolio oversight? How would this approach affect efforts to maintain resource adequacy by the publicly-owned utilities (POUs)?

This question cannot be answered definitively until the Commission issues its final decision on the Resource Adequacy methodology. However, the emissions compliance requirement will probably complicate the issue of eligibility to sell capacity. If a generator sells Resource Adequacy capacity and is therefore required to bid into the CAISO dispatch, who will be responsible for surrendering allowances when the energy is actually dispatched? Under the first-seller approach, the generator is responsible for obtaining and surrendering the allowances. Under a load-based system, this responsibility is less clear. At a minimum, it will greatly complicate the procurement evaluation for both the LSE and the Commission. How will market participants judge the trade-off between “cheap” but “dirty” capacity versus “expensive” but “clean” capacity?

Under a first-seller approach, neither the Commission nor the LSE will need to take note of emissions compliance issues in Resource Adequacy dockets. Since suppliers will be responsible for emissions compliance, all that the Commission will have to do is review the bids and verify that the utilities have selected the lowest priced offers. The costs of emissions compliance will be reflected in the bids, so the most cost effective solution will prevail.

Conversely, if load is responsible for emissions compliance, analyses will have to be conducted to determine the optimum mix of higher-priced but “cleaner” and lower priced but “dirtier” units. It therefore appears that the first-seller approach reduces the burden on the

Commission and LSEs, and ensures unambiguous and optimum results. To achieve the same results would require much more administrative effort using a load-based paradigm.

With regard to the impact on a POU effort to attain Resource Adequacy, the same general administrative and analytical benefits likely would apply.

21. How would a deliverer/first-seller approach interact with the Public Utilities Commission's promotion of end-use efficiency? How would this approach affect energy efficiency programs for the POUs? Under which system (deliverer/first-seller or load-based) would the penetration of end-use efficiency likely be greater? Why?

Advocates of a load-based approach believe that making LSEs responsible for emissions compliance increases the likelihood that California will reach its emission reduction goals and is in accord with the Commission's promotion of end-use efficiency. Under this theory, LSEs will have more incentive to invest in efficiency in order to reduce their allowance needs and costs. Proponents also believe that a load-based approach will be cheaper for consumers. However, there are inherent flaws associated with a load-based approach.

First, the market will induce some level of efficiency investment from electricity consumers. Second, education and publicity have and will continue to play a critical role in inducing residential customer efficiency actions regardless of whether California adopts a load-based or first-seller emissions scheme. Third, there is a long history of programs that are intended to encourage energy efficiency by end users (*e.g.*, rebates and tax credits). There is no reason to believe that these types of programs will be eliminated or materially change under either a load-based or first-seller approach.

Points two and three address any perceived "market failure" gaps between truly cost-effective solutions and consumer behavior. However, the overwhelming majority of low-cost energy efficiency emission reductions will be obtained in industrial and large commercial

facilities. These facilities are best targeted through a source-based system because only then will they receive adequate price signals on emissions costs associated with the energy they use and factor such costs into production and investment decisions.

One policy option that could encourage efficiency investments in a first-seller system would be to auction allowances and earmark some portion of the auction proceeds to a fund that would be used for residential end-use efficiency programs. In addition, California has some degree of control over whether and to what extent LSEs promote energy efficiency programs. More specifically, LSEs are most apt to invest in customer efficiency efforts when they are allowed to recover the cost of such efforts. Thus, California can promote end-use efficiency by incentivizing such programs through the LSEs.

22. How would a deliverer/first-seller approach interact with the State's Renewable Portfolio Standard requirements (both existing and proposed)?

It is unlikely that there will be any differential impact on California's Renewable Portfolio Standard ("RPS") from a first-seller versus a load-based approach. The RPS requirements are partial and indirect efforts to reduce GHG emissions in an environment that lacks direct regulatory controls on GHG emissions. Operationally, they are two separate programs, and do not directly interface, despite the fact that their innate purposes are very similar. This is an extremely inefficient approach, but it is nonetheless the one that the California Legislature has mandated. Once California imposes an absolute cap on GHG emissions, the RPS becomes superfluous as a means for reducing emissions. Under a GHG cap, an RPS is actually counterproductive in that it provides a subsidy to a specific approach to GHG reduction, and may result in the "over-procurement" of renewable energy when there are cheaper sources of GHG reduction available. The result is an artificial cost increase to consumers with no corresponding decrease in GHG, thus squandering society's resources.

23. How should renewable energy generators be treated under a deliverer/first-seller system?

California should treat all generators equally. If a renewable energy generator has emissions, it would surrender allowances; if it does not, then there would be no need for it to surrender allowances.

24. Compare and contrast the impact of a deliverer/first-seller and a load-based approach on the voluntary renewables market.

It is unclear what is meant by the phrase “voluntary renewables market.”

25. Would one approach (deliverer/first-seller or load-based) have an advantage over the other in producing the greatest amount of emissions reductions through modifications (e.g., retrofitting, efficiency improvements, etc.) to existing power plants? Why?

See the answer to Question 14.

26. What would be the data and administrative requirements of the deliverer/first-seller approach?

There are three basic administrative requirements for reporting, tracking and verifying emissions. First, emissions must be tracked from in-state sources. Second, imports must be tracked and assigned emissions responsibility. Third, emissions allowances that have been surrendered must be matched to the in-state generation and energy imports.

The comparative simplicity of emissions tracking in a source-based market must be reiterated. In a source-based system, emissions from stationary sources are easily known and verifiable. Once created and measured at a source, no further downstream tracking is necessary. On the other hand, in a load-based approach and for imports under a first-seller approach, downstream ownership of output also must be tracked, resulting in extra costs, regulatory oversight and administrative burden.

27. How would the deliverer/first-seller approach relate to the Public Utilities Commission/Energy Commission Staff reporting protocol proposal, i.e., would the deliverer/first-seller approach require modifications to the Staff reporting proposal, or could it serve as an interim reporting protocol? If modifications are required, what exactly would they be?

The Joint Proposal lays out seven criteria for a viable reporting protocol: accuracy, consistency, simplicity, transparency, minimizing unintended consequences, setting appropriate policy signals, and expandability. The table in Attachment A demonstrates that, overall, a source-based or first-seller approach will better fulfill these criteria.

Second, the Joint Proposal sets out recommendations for the electricity sector reporting protocols. If California adopts a first-seller approach, the primary changes that California would need to make to the Joint Proposal's recommendations would be to eliminate steps from the process, as indicated in the table in Attachment B.

28. If a deliverer/first-seller approach is adopted, what would be the pros and cons of requiring reporting both from deliverers/first sellers and retail providers, in order to provide ARB with multiple control data sets for comparison?

Mandating double-reporting is a belt-and-suspenders solution: if applied properly, only one is necessary. The resulting inefficiency and economic burdens created by duplicative reporting would be in conflict with the commitments in AB 32 and the MAC Report to *cost-effective* greenhouse gas emission reduction.⁹

29. Compare and contrast the ability of a deliverer/first-seller and a load-based system to create confidence for investors and confidence for environmental advocates about tracking and compliance.

See MSCG's response to Question 14. Investors want an emissions allowance market that is liquid, fungible, stable, and allows them to monetize emission reductions accurately,

⁹ AB 32 § 38560; MAC Report at iv.

quickly and without undue administrative costs. Under such circumstances, appropriate economic signals that trigger confidence in the program will be sent to investors.

Environmental advocates want a system that ensures emissions reduction goals are actually met. Thus, they want tracking and compliance measures that reduce the potential of market participants being able to escape emission-reduction requirements. As indicated above in response to Question 9, it is not possible to prevent leakage or contract shuffling under either a load-based or first-seller approach. So environmental advocates' concerns about tracking and compliance are addressed sub-optimally under both. However, as the MAC Report advances a source-based approach for in-state resources, it is preferable to a load-based approach because of the ease and accuracy associated with regulating emissions at the generator-level. Where imports are concerned, the first-seller approach has the same tracking and compliance issues associated with a load-based model.

Environmental advocates also should be concerned that, in a load-based system, there is another potential loophole with regard to total megawatt hours ("MWh") created and the associated GHG emissions. Visualize an unspecified resource contract where the purchaser buys 95 MWh of power at its preferred node. Further assume that line losses are 5%. Is the LSE responsible for surrendering the GHG allowances associated with the 95 MWh it purchased, or the 100 MWh generated at the source that were required to deliver 95 MWh to the load bus? The spirit of a load-based approach presumably says the latter. However, calculating the specific amount of losses attributable to each MWh delivered is at best a complicated exercise and at worst may not be possible (the simplifying assumption of 5% used in the example will not apply in the "real world"). One approach might be to gross up the purchased MWhs by the system average line loss to calculate the associated allowance responsibility. Perhaps this is a close

enough approximation for practical purposes. However, any assigned or calculated methodology has the potential to reduce accuracy. It also reduces incentives for more efficient contracting practices, where an LSE might find it less expensive to contract with a supplier who can source power from locations with a lower than system-average loss factor. The bottom line is that this concern can at best be accounted for through an approximating administrative mechanism, while under a first-seller paradigm, it is simply not an issue that has to be addressed for in-state resources.

For imports, as with most comparisons, the problem largely would be the same under either approach. Losses from the border to the supply node are irrelevant, as the MWhs received at the border are the ones that must be accounted for. Upstream of the border, it may not be relevant as the emissions responsibility will be a system-based approximation. For that reason, the level of precision may not be fine enough for losses to make a significant difference, and in any case, no obvious solution presents itself (other than perhaps the aforementioned adder based on system-average losses).

30. Who/what governs access to the purchasing/selling entity data on the NERC E-tags? What would a state agency need to do to obtain access to E-tag data?

Only parties in the “electricity ownership chain” have the right to view E-tags. Moreover, it is not entirely clear which party (*e.g.*, NERC, WECC, or each party to each E-tag) has “ownership” of the E-tag process, and could therefore grant authorization to a market participant or regulatory body to view an E-tag. Finally, to reiterate, E-tags do not provide an accurate means of tracking who owns power supplied to California LSEs, so it is not clear how gaining such access would further the State’s objectives.

31. What role would the CAISO play, if any, in the implementation and administration of a deliverer/first-seller program? What role would other control area operators or balancing authorities play?

CAISO's role in the California energy markets makes it one candidate for administering at least some portion of an electricity cap-and-trade. However, as CAISO operates under a FERC tariff and subject to FERC's oversight, any effort to have CAISO provide services related to California's emissions program could be subject to FERC review and approval.

If CAISO is the entity that has information on imports – at least for the interfaces it operates – then it may make sense for California to find a means of working with CAISO to capture and report this data. It might be necessary to impose a similar obligation on both IOUs and POUs that operate facilities that transport power across borders. Finally, if there are federal agencies that operate facilities that bring power across the border (*e.g.*, the Western Area Power Administration) it may be necessary to seek their voluntary cooperation. Tracking imports should not be substantively different under either approach. CAISO would not need to participate in the implementation or administration of the in-state component of a first-seller system because the generating unit is already responsible for compiling this information and reporting it to the CARB.

32. Would implementation of a deliverer/first-seller approach necessitate auctioning of GHG emissions allowances? Why or why not?

MSCG opposes the free allocation of emissions allowances under either approach. To ensure that emissions trading works, it is crucial that those ultimately responsible for surrendering allowances have easy market access to allowances. This means that allocating allowances for free as a form of compensation, with no knowledge as to if or when the recipient will enter the emissions market, leads to upward price biases. Auctions are preferable because they avoid administrative battles over who gets allocations under either approach. They also

ensure that allowances enter the market from the start in order that market participants can discover the price which reflects the marginal cost of reducing emissions. Auction proceeds can be used to compensate various parts of society, if compensation is a policy goal of California.

As to whether or not a first-seller approach would *necessitate* an auction, it is certainly conceivable that an allocation mechanism could be devised that would be roughly workable under either a load-based or first-seller approach. However, allocation is, at a minimum, much more complicated under the first-seller approach due to the larger number of parties responsible for surrender and the need to account for new entrants. The biggest complication is related to imports. How would one assess in advance which entities received how many allowances? Furthermore, any allocation scheme will be subject to intense lobbying efforts and political battles. Regardless of which approach is ultimately adopted, auctions are clearly preferable to allocations by a large margin. The only arguments supporting allocations pertain to issues surrounding “equity,” and any such claims can be addressed by assigning Auction Revenue Rights.

- 33. If you do not believe that an auction would be required under the deliverer/first-seller approach, explain how an emissions allocation system would work under a deliverer/first-seller approach. In doing so, answer the following:**

No response provided.

- 1. *To whom would allocations be given?***
- 2. *If you recommend allowances be given to deliverers/first sellers, on what basis would allocations be given during any particular compliance period?***
- 3. *How would the state of California know how many allowances were needed by importers?***
- 4. *How would marketers be treated?***

- 5. *How would electricity service providers be treated?*
 - 6. *Would zero-carbon generators also receive allowances?*
 - 7. *What would be the likelihood of windfall profits under such a system?*
 - 8. *How could such a system prevent windfall profits?*
34. **If you recommend allocation of allowances to retail providers, followed by an auction to deliverers/first sellers, how would such an auction be administered? What kinds of issues would such a system raise?**

No response provided.

35. **Would GHG emissions allowances created under a deliverer/first-seller compliance regime in the electricity sector be compatible for trading with other sectors in the California economy, assuming a multisector cap-and-trade system? How?**

Yes. In a first-seller regime, allowances should not have to be designed any differently when multiple sectors are brought into a single emissions trading scheme.

36. **Compare and contrast the ability of a deliverer/first-seller and a load-based approach to avoid double-counting of emissions between states.**

The problem of double counting between states is essentially equivalent under a load-based or a first-seller approach, given current regulations. In the future, if other states adopt a source-based or first-seller approach, or a national source-based program is implemented, then double counting eventually ceases to be an issue.

37. **How should exports from California be handled under a deliverer/first-seller approach? Would the proper treatment of exports depend on whether the receiving state has a cap-and-trade system? If so, how?**

Under a first-seller approach, it would not be necessary to consider exports. The destination would be irrelevant, since the generator would be responsible for surrendering allowances for all GHGs created and emitted regardless of where the power is sold. In a load-based system, exports must be accounted for separately, as no California LSE will be responsible for the associated GHGs.

38. If some states in the region adopt a source-based system (or a load-based system which also regulates exports), how would the State of California verify the true source of imports in order to avoid double-regulation of power imported from other capped states?

It would not be possible under either approach to verify with certainty the “true” source of imports. However, there are two administratively viable categories of approaches to assigning emissions responsibility to imports. One is the “system emission rate” approach. The other is the “contract for rights to claim emissions attributes” approach (*i.e.*, an approach that relies on contractual provisions that allow the purchaser to claim for reporting purposes the emissions profile associated with a given generation source). Both are practical from an administrative perspective, but neither actually tracks generation, and hence emissions responsibility, from source to sink.

39. How would a deliverer/first-seller approach function relative to an Oregon load-based system (as currently proposed by Oregon)?

MSCG has not had sufficient opportunity to research the proposal(s) that are pending in Oregon.

40. How easily could a deliverer/first-seller approach scale or link to multi-state, national, or international programs?

A source-based approach would be the easiest one to link to other programs because it is the approach that is currently in use in the European Union, will be implemented in 2009 by the states participating in the Regional Greenhouse Initiative (“RGGI”), and appears to be the core assumption in the overwhelming majority of legislation proposed in the U.S. Congress.¹⁰ The hybrid approach proposed in the MAC Report is preferable to a pure load-based approach

¹⁰ See, e.g., Climate Stewardship and Innovation Act of 2007 (S.280); Global Warming Pollution Reduction Act (S.309); Electric Utility Cap and Trade Act of 2007 (S.317); Global Warming Reduction Act of 2007 (S.485); Low Carbon Economy Act (S.1227), all introduced in the 110th Congress, 1st Session.

because it provides for source-based regulation of in-state generation, and thus is more likely to easily link to programs in other jurisdictions.

41. Would one approach (deliverer/first-seller or load-based) be easier to transition into a potential federal GHG regulatory system? If one would be superior in this respect, explain why and what assumptions you are making about the likely federal framework.

The MAC Report has as one of its goals to establish a cap-and-trade system that could be a model for a federal GHG program.¹¹ At this point, there are no load-based proposals in the major climate change bills under consideration by Congress, so a source-based or first-seller approach would better serve California's stated goal. However, this does suggest one issue that California should consider under either a first-seller or load-based approach: How will California modify its system when certain elements become unnecessary (*e.g.*, if all Western Electricity Coordinating Council jurisdictions go to source-based regulations, then any method for assigning emissions to imports becomes pointless)?

42. What are the merits of the deliverer/first-seller proposal as a model for other governments' efforts, particularly at the national level?

As mentioned in our introductory section, a prime purpose of the California GHG regulation program should be to lead by example and implement a model that can be viewed by other jurisdictions as a "best practice" approach. As discussed throughout these comments, MSCG believes that the best approach is a source-based one. Because of the express requirement of AB 32 to meaningfully account for imports, a pure source-based approach does not appear to be an option available to California regulators. Given that constraint, we believe that the first-seller approach is the best practical alternative.

¹¹ MAC Report at Chapter 5.

When Congress or other states investigate programs to regulate GHG emissions, they are likely to look to the “big three:” the EU, RGGI and California. Generally, the already operational programs (*e.g.*, EU and RGGI) will logically carry greater weight. California will not be operational until 2012 and, therefore, will be of less interest due to a lack of real world experience. However, there may be one parallel for a national program: the “import” situation California faces may be analogous to the one the United States faces *vis-à-vis* Canada.

Given the approaches being taken by the EU and RGGI, and the fact that the proposals before Congress are source-based, it seems unlikely that a load-based model would attract much emulation. For example, other states and the U.S. Congress may be unwilling to follow California’s lead if the State insists on a load-based approach that, when compared to a source-based solution, is fraught with administrative burdens and is not the best means of ensuring that emissions are traceable and reduced. Similarly, others may not want to adopt California’s load-based approach if there is a perception that they can promote end-use efficiency and green energy sources through more targeted measures. California’s emissions reduction goals would be better served by developing a sourced-based program or “best practices” model that is more likely to be emulated by other regions.

- 43. Would the Federal Power Act preempt adoption of the deliverer/first-seller approach? Why or why not? Does it make any difference that the federal government has not issued any regulations in this specific area?**

No response provided.

- 44. For purposes of your legal analysis of the previous question, would your opinion differ if the deliverer/first-seller were the reporting entity only and not also the point of regulation? Why or why not?**

No response provided.

- 45. Could the deliverer/first-seller approach be designed or implemented in a way that would avoid or lessen problems under the Federal Power Act? If so, how?**

No response provided.

- 46. Compare Federal Power Act issues under a deliverer/first-seller approach and a load-based approach.**

No response provided.

- 47. If you conclude that Federal Power Act preemption would be a problem, could FERC action (e.g., approval of a CAISO tariff rule) ameliorate this problem? If so, what specifically could FERC do? Could FERC ameliorate any Federal Power Act concerns related to publicly-owned utilities?**

No response provided.

- 48. Does the deliverer/first-seller approach raise problems under the dormant Commerce Clause?**

No response provided.

- 49. Could the deliverer/first-seller approach be designed or implemented in a way that would avoid or lessen problems under the dormant Commerce Clause? If so, how?**

No response provided.

- 50. Are issues under the dormant Commerce Clause more or less serious under a deliverer/first-seller approach compared with a load-based approach? Explain.**

No response provided.

- 51. The Market Advisory Committee report suggests that the value of GHG emission allowances “can be used to fund innovative emission reduction technologies and to focus pollution-reduction efforts in low-income and minority communities” or “can be utilized to provide transition assistance for workers and industries subject to strong market pressures from competitors operating in jurisdictions that lack similar caps on greenhouse gas emissions” (Market Advisory Committee report, at iv - v) or “should be directed to investments in end-use efficiency improvements” (Id., at 54). Would these uses raise problems under the dormant Commerce Clause? Would these problems be more or less serious under a deliverer/first-seller approach compared with a load-based approach?**

No response provided.

- 52. Does ARB have the authority, under AB 32 or any other statute, to auction allowances to emit greenhouse gases? Explain.**

AB 32 does not expressly prohibit CARB from auctioning emission allowances. Indeed, section 38562(b)(1) orders CARB to “design the regulations, including distribution of emissions allowances where appropriate, in a manner that is equitable, seeks to minimize costs and maximize the total benefits to California, and encourages early action to reduce greenhouse gas emissions.” Thus, CARB has discretion to allocate allowances in a manner that fulfills its statutory mandate, including through auctions.

Section 38562(b)(4) requires that activities undertaken pursuant to the regulations “complement, and do not interfere with, efforts to achieve and maintain federal and state ambient air quality standards and to reduce toxic air contaminant emissions.” Section 38562(b)(5) requires CARB to consider the cost-effectiveness of its regulations, while section 38562(b)(7) mandates that CARB “[m]inimize the administrative burden of implementing and complying with these regulations.” Allowance auctions are consistent with these goals. Various states are moving toward allowance auctions and there is similar legislation pending in Congress.¹²

¹² MAC Report at 58-59; *see also supra* n.10 (providing examples of major federal climate change bills pending before Congress).

Moreover, auctions are more cost effective and impose less administrative burdens than free allocations.¹³ Thus, CARB can and should institute allowance auctions to fulfill the Legislature's mandates in AB 32.

53. Are there any other legal issues that the Public Utilities Commission and the Energy Commission should consider in deciding whether to investigate the deliverer/first-seller approach further? Explain.

MSCG agrees with the MAC Report that a primary legal issue that California must consider is whether in-state and out-of-state suppliers are similarly treated.¹⁴ MSCG also agrees that: (a) the load-based approach could be consistent in its treatment of imports versus domestically generated power insofar as both are regulated at the LSE; and (b) the first-seller approach is consistent in regulating the entity that first sells power into California's electricity system, no matter where the power originated. Thus, the legal analysis should not be fundamentally different for a load-based or first-seller approach. MSCG reserves its right to comment on the legality of any California cap-and-trade proposal once the State proposes specific details on its plan.

¹³ AB 32 §§ 38562 (a), (b)(7).

¹⁴ MAC Report at 45.

III. CONCLUSION

MSCG respectfully requests that the Commission consider the foregoing comments in its consideration of the first-seller proposals in the MAC Report.

Respectfully submitted,

/s/

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August 6, 2007

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Attachment A

Criteria for Designing a GHG Reporting Protocol	Load-Based Approach	First-Seller Approach	Comparison
<p><u>Accuracy:</u> The reporting protocol should be designed to produce an accurate estimate of the GHG emissions that result from the consumption of electricity in California.</p>	<ul style="list-style-type: none"> Where the source is known, uses in-state generation data compiled by LSEs Imports rely on assigned data 	<ul style="list-style-type: none"> Uses in-state generation data compiled by the source Imports rely on assigned data 	<p>The first-seller approach would yield the most accurate results because it would report a greater percentage of actual emissions data and reduce the amount of data that must be tracked through commercial transaction chains. Both the first-seller approach and load-based approach rely on assigned data for imports. The primary accuracy difference between the first-seller and load-based approaches arises from the fact that the load-based approach relies on ownership tracking downstream of the source in-state, increasing the opportunity for error. Secondly, the load-based approach does not account for exports. <i>See also</i> responses to Questions 7, 9 and 26.</p>
<p><u>Consistency:</u> All reporting entities should use the same emission factors for the same sources of purchased electricity.</p>	<ul style="list-style-type: none"> Would require consistency in emissions calculations among reporting entities 	<ul style="list-style-type: none"> Would require consistency in the calculation of emissions among reporting entities 	<p>There is no material difference from a consistency perspective.</p>
<p><u>Simplicity:</u> The final reporting protocol should not impose overly burdensome procedures on either reporting entities or the state agencies overseeing the program.</p>	<ul style="list-style-type: none"> For in-state generation and imports, downstream ownership of output must be tracked 	<ul style="list-style-type: none"> For in-state generation, emissions are measured at a source and no further downstream tracking is necessary For imports, downstream ownership of output must be tracked 	<p>A first-seller approach would be simpler because it would not require transactional tracking for in-state generation. This would also eliminate the need to calculate “net purchases” for LSEs. <i>See also</i> responses to Questions 7, 8, 9 and 26.</p>

Criteria for Designing a GHG Reporting Protocol	Load-Based Approach	First-Seller Approach	Comparison
<p><u>Transparency:</u> Transparency should be maintained in the assumptions about the electricity system and California’s influence on emissions occurring in other states, and, to the extent possible, derived emission factors used for reporting should use publicly available data and any assumptions underlying modeling or other analysis should be explicit.</p>	<ul style="list-style-type: none"> • The need for tracking transactional chains adds opacity 	<ul style="list-style-type: none"> • The first-seller approach improves transparency by focusing on actual emissions sources for in-state generation 	<p>The first-seller and load-based approaches would be equally transparent where assumptions, calculations and assignments are employed, such as for imports. However, the direct reporting of emissions from sources, eliminating intermediate steps and reducing or eliminating much, if not all, of the need for estimations and other non-empirical data, significantly improves transparency for in-state sources.</p>
<p><u>Minimization of Unintended Consequences:</u> The reporting method should not distort the electricity markets by causing retail providers to make non-optimal resource choices.</p>	<ul style="list-style-type: none"> • Load-based has the potential to distort contracting practices due to the need to manage GHG “budgets.” This could reduce reliability, increase costs and complicate CAISO dispatch activity. 	<ul style="list-style-type: none"> • Emissions costs will be captured in price quotes, eliminating the need for purchasers to consider emissions issues in purchasing practices. Contracting will continue as usual. CAISO dispatch optimizations will include an emissions parameter. 	<p>By definition, unanticipated consequences cannot be anticipated. However, the more complex a system, the greater the potential for unanticipated consequences and for gaming. Thus, a load-based system is at much greater risk of suffering such results. <i>See also</i> responses to Questions 13, 14, 17, 19, 20, and 21.</p>
<p><u>Set Appropriate Policy Signals:</u> While the reporting method should be designed to report accurate emissions complete accuracy is not possible. Where estimates are needed, the Protocol should provide incentives that tend to reduce overall GHG emissions.</p>	<ul style="list-style-type: none"> • Where the source is known, uses in-state generation data compiled by LSEs • Imports rely on assigned data 	<ul style="list-style-type: none"> • Uses in-state generation data compiled by the source • Imports rely on assigned data 	<p>The three key policy signals at issue here are conservation by load, investment by generation, and dispatch. The direct price signals sent by the first-seller approach are of major importance for dispatch, are clearer for investment analysis purposes, and are equivalent with regard to conservation. <i>See also</i> responses to Questions 7 and 9.</p>

<p><u>Expandability</u>: The reporting system is being designed by California to implement its GHG reduction requirements. One aim of this system should be that it can be readily expanded to other states without changing the reported emission profile of LSEs.</p>	<ul style="list-style-type: none"> • Reporting obligation imposed on LSEs 	<ul style="list-style-type: none"> • In-state generation and importers have the reporting obligation 	<p>Because of the need to estimate and assign emissions profiles to imports under either approach, neither approach can insulate California reporting entities from reporting changes if other states implement some sort of GHG regulation. However, strictly speaking, the first seller approach eliminates the requirement for LSEs to report anything (except when they are the “importer” or “generator”). Thus, by definition, the first-seller approach eliminates the possibility for LSEs to change their reported emissions profile, since under the first-seller approach, LSEs would not be required to report their emission profiles in the first place. <i>See also</i> responses to Questions 40-42.</p>
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Attachment B

Joint Proposal’s Recommendations for Electricity Sector Reporting Protocol in a Load-Based System	Changes California would need to make to the Joint Proposal’s Reporting Protocol if a First-Seller System is Adopted
<u>Reporting Entities:</u> All retail providers of electricity should be required to report with cooperation from other sources.	In a first-seller system, the reporting obligation would fall on in-state generators and importers, thereby eliminating the need for LSEs to report emissions. This would require some non-material changes to the reporting procedures.
<u>Determining Approved Emission Factors:</u> California would calculate default emission factors for three subsections of WECC to be used for annual reporting: California, Pacific Northwest, and Southwest. California will use the factors to calculate emissions for all unspecified purchases that cannot be tracked back to more specific asset owning entities for which emission factors have been approved. California would approve supplier-based emission factors on a provisional basis to monitor the accuracy and reliability of this approach.	For in-state generation under a first-seller approach, there would be no need to calculate or monitor emissions factors as California would use actual generator emission data. Estimates and monitoring may still be required for imports under either approach.
<u>Reported Data:</u> For each owned facility, each reporting entity should provide the emissions for all GHGs and the generation data transmitted to CARB under the source-based reporting system.	For in-state generation under a first-seller approach, the generator would report to CARB or any other entity California selects.
<u>Reported Data:</u> For specified purchases from power plants that report to CARB, the retail provider should list the quantity of electricity purchased, including associated transmission losses.	This step would not be necessary under a first-seller approach.
<u>Reported Data:</u> Each retail provider should list all wholesale purchases of power from unspecified sources, including transmission losses, by counterparty and region.	This step would not be necessary under a first-seller approach.

Joint Proposal’s Recommendations for Electricity Sector Reporting Protocol in a Load-Based System	Changes California would need to make to the Joint Proposal’s Reporting Protocol if a First-Seller System is Adopted
<u>Reported Data:</u> For counterparties for which California has certified emission factors, the retail provider should multiply the purchases from each supplier by the certified emission factor.	This step would not be necessary under a first-seller approach.
<u>Reported Data:</u> Reporting parties should sum the total CO ₂ , N ₂ O, and CH ₄ emissions from owned generation assets, specified purchases, and unspecified purchases.	This step would be completed by the source or the importer.
<u>Reported Data:</u> Retail providers should report all wholesale sales by counterparty and region.	This step would not be necessary under the first-seller approach.
<u>Reported Data:</u> Retail providers should adjust total emissions from wholesale sales.	This step would not be necessary under the first-seller approach.
<u>Reported Data:</u> The adjusted quantity of emissions from owned generation and purchases is the quantity for which the retail provider is deemed responsible over the reporting period.	This step would not be necessary under the first-seller approach.

CERTIFICATE OF SERVICE

I hereby certify that I have this day served a copy of the foregoing Comments of Morgan Stanley Capital Group Inc. on the Market Advisory Committee to the California Air Resources Board's Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California on all of parties of record in R. 06-04-009 by electronic mail and by U.S. mail to those parties who have not provided an electronic address to the Commission. I also have sent hard copies by overnight mail to the assigned Commissioner, Michael R. Peevy, and the assigned Administrative Law Judges, Charlotte F. TerKeurst and Jonathan Lakritz.

Moreover, pursuant to the July 19, 2007 Administrative Law Judges' Ruling Requesting Comments and Legal Briefs on Market Advisory Committee Report and Notice of *En Banc* Hearing issued in R. 06-04-009, I have sent one hard copy of these comments by overnight mail to the California Energy Commission and also have sent electronic copies of these comments to docket@energy.state.ca.us and kgriffin@energy.state.ca.us.

Dated at Washington, DC, this 6th day of August, 2007.

/s/

Adam J. Katz

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